

7. Contributions to a General History of the *Spongiadæ*.

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(Plates XLVI. & XLVII.)

GEODIA CARINATA, Bowerbank. (Plate XLVI. figs. 1-5.)

Sponge sessile, coating stems of *Gorgonia* or Fuci. Surface smooth, but furnished with numerous longitudinal carinæ. Oscula simple, dispersed, few in number. Pores inconspicuous. Dermal membrane thin and pellucid, furnished abundantly with multiangulated cylindrical spicula. Skeleton—fasciculi multispiculous, compact; spicula attenuato-spinulate, bases coincident. Interstitial membranes furnished abundantly with arborescent elongo-subspherostellate retentive spicula, variable in degree of development. Ovaria oval or kidney-shaped, component spicula slender and delicate. Surface-rete very minute.

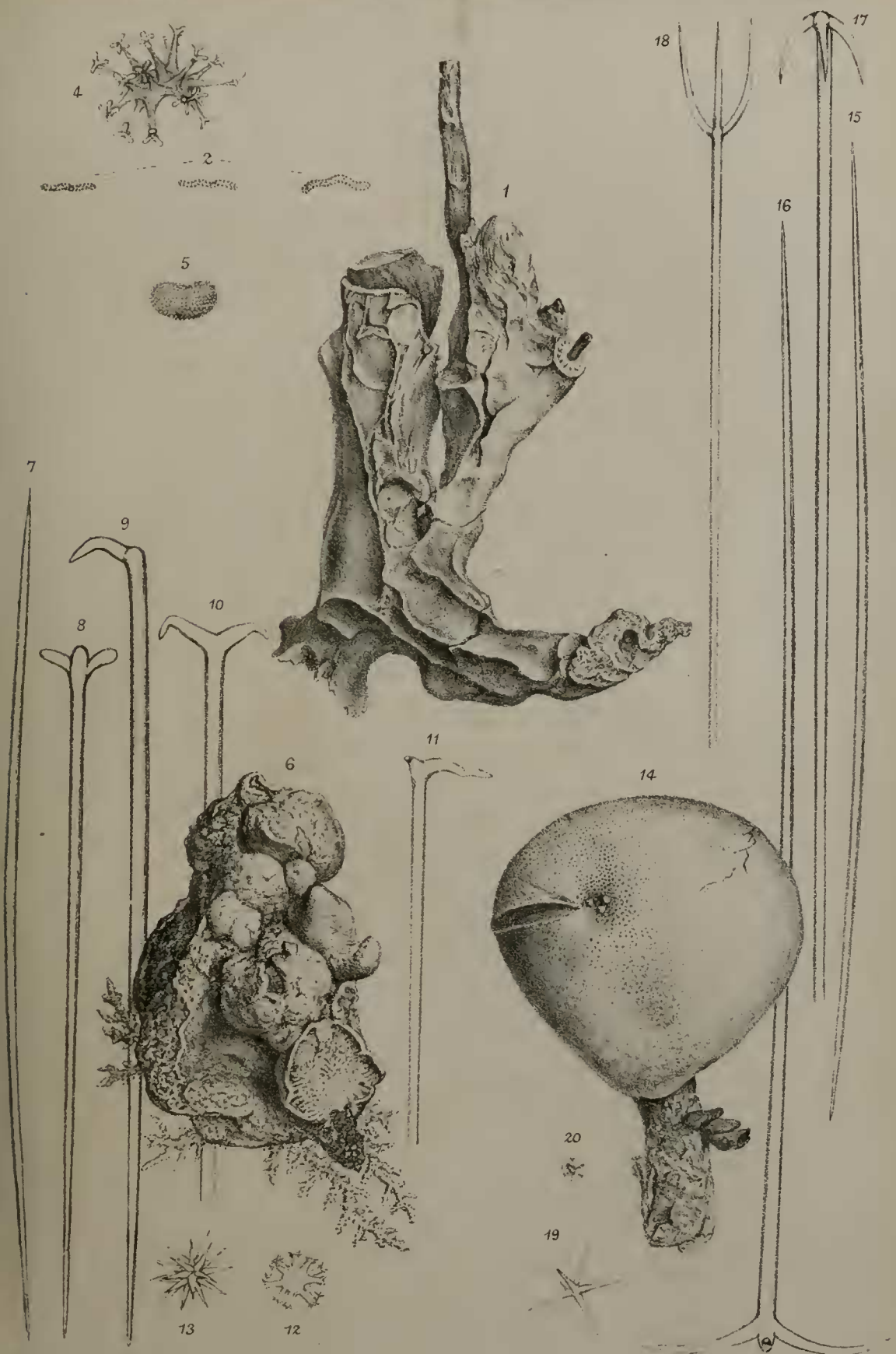
Colour in the dried state light fawn-yellow.

Hab. South Sea (*Mr. Thos. Ingall*).

Examined in the dried state.

I received the figured specimen of this singular species from my late friend Mr. Thos. Ingall in 1854, and I then described and named it in MS.; and subsequently the multiangulated cylindrical spicula of the dermis were described and figured in my paper on the "Anatomy and Physiology of the *Spongiadæ*," in the Philosophical Transactions of the Royal Society for 1858, p. 314, plate xxvi. fig. 10, and also the arborescent elongo-subspherostellate retentive spicula of the interstitial membranes in p. 308, plate xxv. fig. 19 of the same part for 1858. Shortly after I had examined and named the species I saw a similar specimen in the British Museum arranged among the Corals; and I stated to Dr. Baird that it was a sponge and told him the name I had assigned to it, and he forthwith removed it from the case and placed it among the Sponges. Subsequently I obtained a second specimen by purchase in the year 1864. The whole three specimens were similarly parasitical and very closely resembled each other in their external characters, and especially so in their singularly carinated striation. On taking sections at right angles to the surface of the sponge, I found that these elevated ridges were produced by the projection of lines of skeleton-fasciculi through the dermal crust of the sponge to immediately beneath the dermal membrane, but in no instance did they appear to perforate that organ. The greater portion of these carinated elevations were in a longitudinal direction; but occasionally short transverse ridges are found connecting the longitudinal ones with each other.

The dermal membrane is thin and pellucid, and when in a fine state of preservation it is literally crowded with innumerable minute

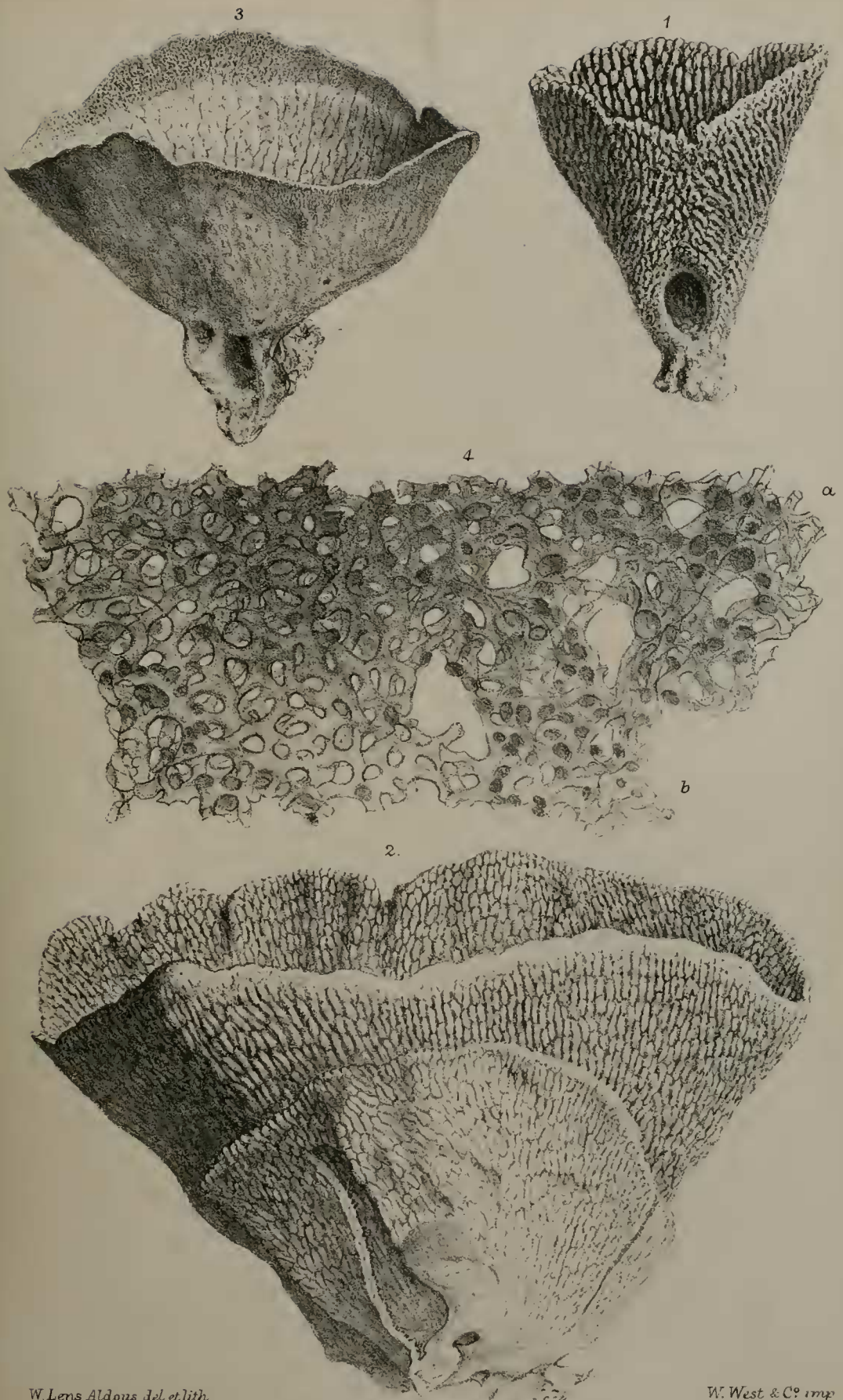


W. Lens Aldous del. a lith.

W. West & C^o imp.

1-5, *Geodia carinata*. 6-13, *G. imperfecta*. 14-20, *G. reticulata*.





W. Lens Aldous del et lith.

W. West & C^o imp

1-2. *Halispongia Ventriculoides*. 3-4, *H. Mantelli*.



multiangulated cylindrical retentive spicula; they are so minute as to require a power of five or six hundred linear to render their forms distinctly to the eye. The number of angles in these spicula vary from two or three to six or seven; and in some cases the angulation is very distinctly and regularly produced.

From the thin coating nature of the sponge the skeleton-arrangement is not so readily demonstrable as in many other species of the genus. The fasciculi are abundantly spiculous and very compactly constructed. The bases of the spicula are all coincident and proximal, while all the apices are distal as regards the direction of the fasciculi.

The interstitial membranes are in many parts literally crowded with the arborescent elongo-sub-sphero-stellate retentive spicula, and they are also dispersed in considerable quantities amongst the ovaria in the dermal crust. These spicula are singular and very characteristic organs. The specimen figured is a very fully developed one. They vary in degree of development to a very considerable extent; and in some the central mass is very thin and elongate.

In the dermal crust of the sponge none but fully developed ovaria are to be found; but they are dispersed in considerable numbers on all parts of the interstitial membranes, and in every stage of development from an elongately oval loosely aggregated mass of very minute spicula to the compact and fully matured organ. The spiculous structure of these ovaria is very much finer and more minute than in any other species of *Geodia* with which I am acquainted.

GEODIA IMPERFECTA, Bowerbank. (Plate XLVI. figs. 6-13.)

Sponge massive, tuberous, sessile. Surface smooth. Oscula simple, minute, dispersed. Pores inconspicuous. Dermal membrane unknown. Skeleton—fasciculi rather loosely constructed; spicula subfusiformi-acerate, rather stout and short. Connecting spicula attenuato-patento-ternate; radii rarely perfectly developed, distal terminations recurved, not very numerous. Interstitial membranes—retentive spicula sphero-stellate with cylindro-subfoliate radii, numerous; and attenuato-stellate, variable in form, occasionally subsphero-stellate more or less. Ovaria oval, depressed.

Colour in the dried state cream-white.

Hab. South sea.

Examined in the dried state.

I obtained four specimens of this species from a dealer in objects of natural history; they are each attached to the basal portion of a specimen of *Oculina rosea* from the South Sea; the figured specimen is the largest of the four. The whole of them possess the same description of tuberous massive form; the smallest two did not exceed an inch in length by about half an inch in breadth. The oscula are so small as to require the aid of a lens of two inches focus to render them readily apparent. I could not find any remains of the dermal membrane on either of the specimens. The connecting-

spicula afford the most prominent specific characters of the species. The normal form is that of a regular attenuato-expando-ternate connecting spiculum, the three radii of which are as nearly as possible equal; but they are very rarely found in this state. Sometimes one or two of the terminal radii are absent or only partially developed, or one or more of them terminate hemispherically. If the radii are completely produced, their apices are mostly recurved or they assume various contortions. If I had had the type specimen only for examination, I might have imagined that these malformations and contortions of the radii were those of the individual only; but I carefully examined microscopically the other three specimens to see whether their spicula agreed in the imperfect development of the radii of the ternate connecting ones of the type specimen; and I found in all of them the same contorted or undeveloped condition of their radii that forms so striking a character in the type one.

The interstitial membranes are abundantly furnished with the two forms of stellate retentive spicula, which, from their structural peculiarities, afford very efficient specific characters. The sphero-stellate ones with cylindro-subfoliate radii are rather the more numerous of the two forms: they do not differ to any great extent in their diameter; a perfectly developed one measured extreme diameter $\frac{1}{81\frac{1}{8}}$ inch. The attenuato-stellate ones vary considerably in their amount of development; many of them have comparatively a small number of radii, and in such cases they are frequently subsphero-stellate: but this does not appear in the fully developed forms, where the radii are too numerous to be counted; a large one of this description measured extreme diameter $\frac{1}{2100}$ inch.

The ovaria are more or less oval and are depressed to a considerable extent; their length is frequently nearly twice that of their diameter. They are abundantly dispersed on the surfaces of the interstitial membranes, and may be seen in every stage of development, from a minute multistellate form to that of the adult ovarium.

GEODIA RETICULATA, Bowerbank. (Plate XLVI. figs. 14-20.)

Sponge massive, sessile. Surface smooth, minutely reticulated. Oscula small, congregated irregularly. Pores inconspicuous, evenly dispersed. Dermal membrane unknown. Skeleton—fasciculi compact, abundantly spiculous; spicula fusiformi-acerate, rather slender; connecting spicula attenuato-patento-ternate, stout and long, numerous, radii moderately long; and recurvo-ternate long and rather slender, numerous; also, rarely, porrecto-ternate long and slender. Interstitial membranes—tension-spicula fusiformi-acerate small and slender, often flexuous; retentive spicula attenuato-stellate very numerous, radii few; also cylindro-stellate, exceedingly abundant and very minute, radii rather numerous. Ovaria small, spherical, rather numerous.

Colour in the dried state cream-white.

Hab. Mexico (*Mr. Thos. Ingall*).

Examined in the dried state.

I received this sponge from my late friend Mr. Thos. Ingall,

labelled "Mexico." It is firmly based on the remains of the stem of a fucus. The surface, to the unassisted eye, has a minutely reticulated appearance, arising from the closely disposed and exceedingly numerous porous depressions; but in the living state it would most probably be quite smooth. The oscula were congregated in an irregular group near the basal attachment; they are simple in structure and very small, the largest of them scarcely a line in diameter. The internal structure is remarkable for the abundant varieties of its spicula. The skeleton-fasciculi are composed of numerous, somewhat slender, fusiformi-acerate spicula; and the fasciculi are very much strengthened near the surface of the sponge by the incorporation in their substance of the shafts of the numerous connecting spicula, those of the patento-ternate ones frequently being nearly twice the diameter of those of the skeleton and considerably longer; both the patento-ternate and the recurvo-ternate ones are numerous; but the porrecto-ternate forms are of rare occurrence and are frequently very slender. The interstitial membranes are abundantly supplied with the two forms of retentive spicula, and especially so with the smallest of the two forms. A fully developed one, of the largest size, measured $\frac{1}{1000}$ inch extreme diameter; and two of the smaller description were $\frac{1}{3000}$ inch and $\frac{1}{4286}$ inch in diameter; and the latter one was not the smallest one in the field of view. The radii of the largest form were always acutely terminated, while those of smaller ones were truncated or slightly expanded at their distal terminations. The retentive spicula are very characteristic of the species, from their minuteness and great abundance on the interstitial membranes; while, on the contrary, the tension-spicula are comparatively of rare occurrence.

The ovaria are abundantly dispersed on all parts of the interstitial membranes in various stages of development.

HALISPONGIA VENTRICULOIDES, Bowerbank. (Plate XLVII. figs. 1 & 2.)

Sponges from Otaheite, Ellis and Solander's Natural History of Zoophytes, p. 206, tab. 59. figs. 1, 2, 3.

Spongia otahitica, Esper, vol. ii. tab. of Sponges lxi. (copied from Ellis and Solander).

Sponge cup- or fan-shaped, thin; pedicle short and stout. Surface rather prominently ridged or mammillated in lines radiating from the base to the distal margin, ridges or mammæ more or less elongated, margin of cup thick and rounded. Dermis retiform; rete abundantly arenulous. Oscula simple, minute, dispersed, few in number. Pores inconspicuous. Skeleton—primary fibres abundantly arenulous; secondary fibres rarely arenulous.

Colour in the dried state ochreous yellow.

Hab. South Sea, Otaheite.

Examined in the dried state.

The prevailing form of this species is the cup-shaped one, subject to a considerable amount of variation. The specimen represented by